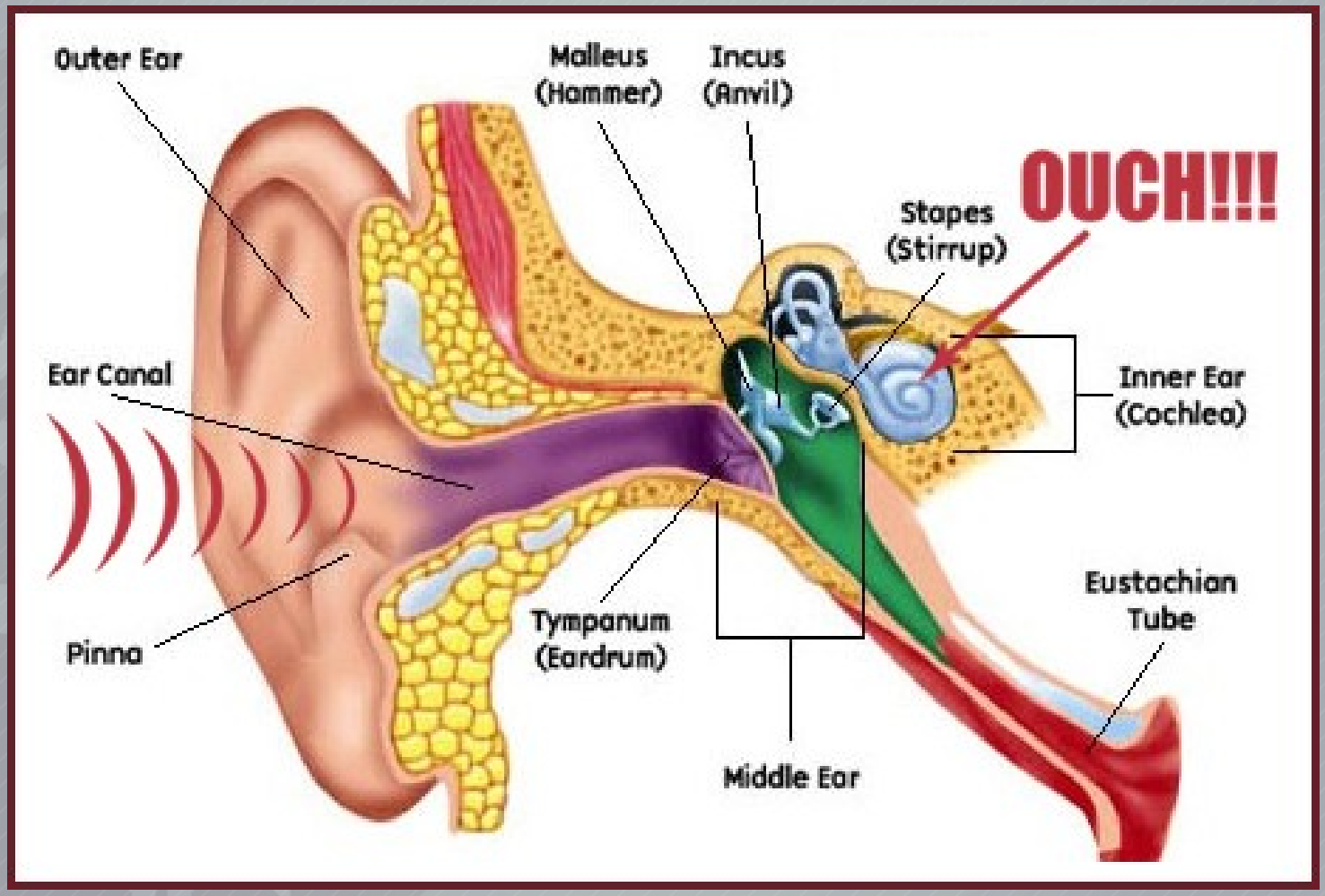
Importance of Hearing to the War Fighter

Some Facts……

- Hazardous noise exposure currently greatest in > 30 yr
- 1 in 3 post-deploying OIF soldiers report exposures to a acoustic trauma
- 1 in 4 post-deploying OIF soldiers report hearing loss ar hearing complaints (e.g. tinnitus)
- 7 of every 10 WIA evacuations are blast-related injuries (i.e., related hearing/balance problems due to tympanic membrane perforations, hearing loss)

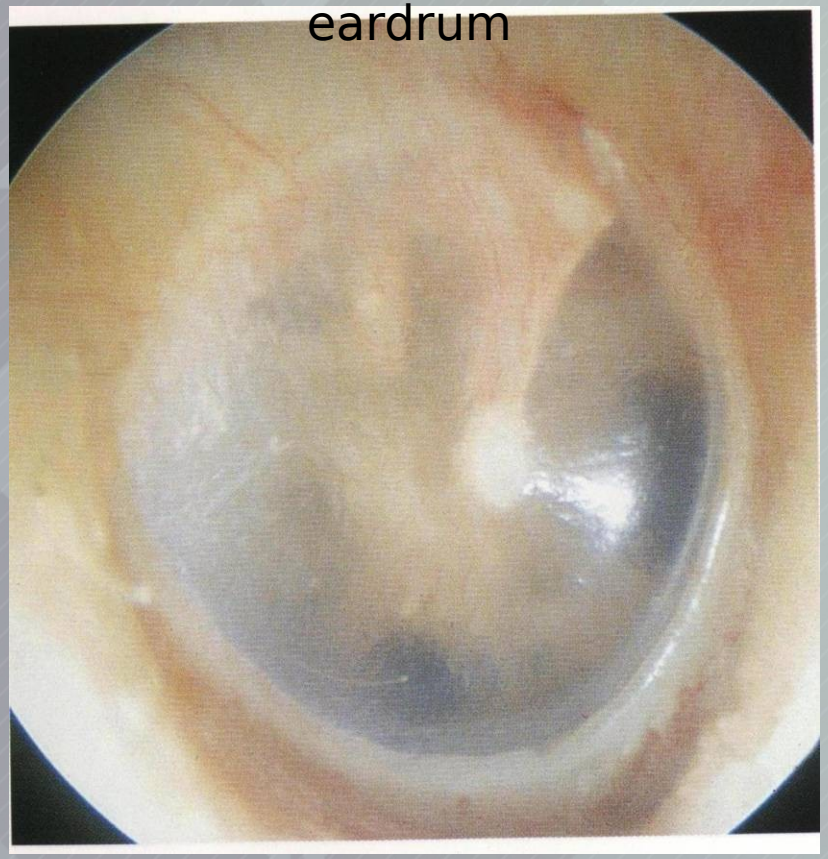
FY2011 – Tinnitus #1 and Hearing Impairment #2 di

Anatomy of the Ear

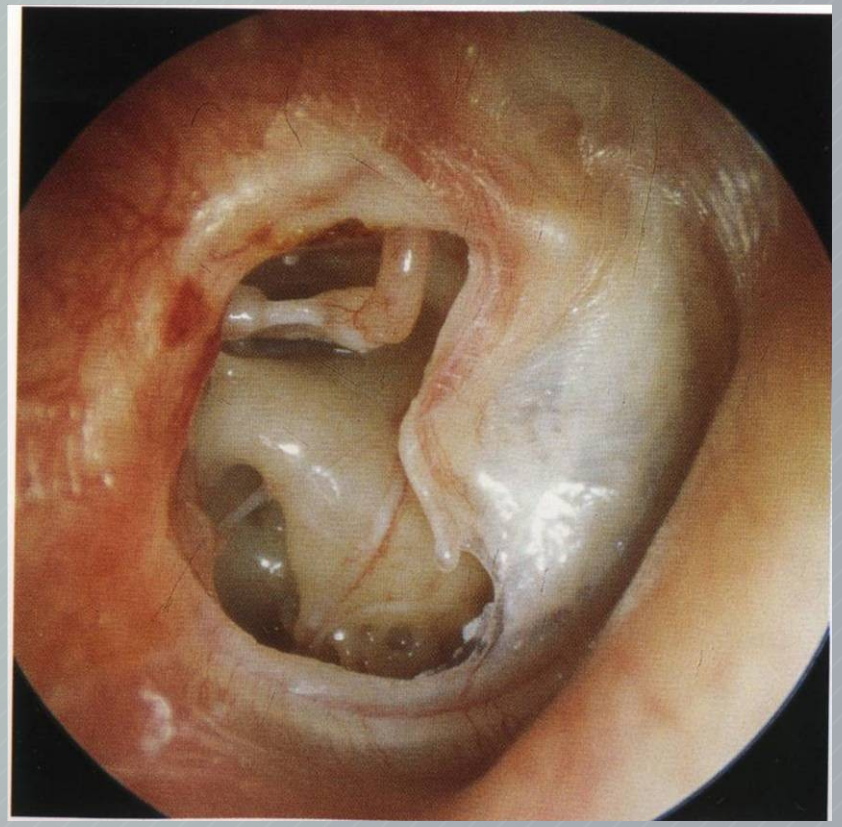


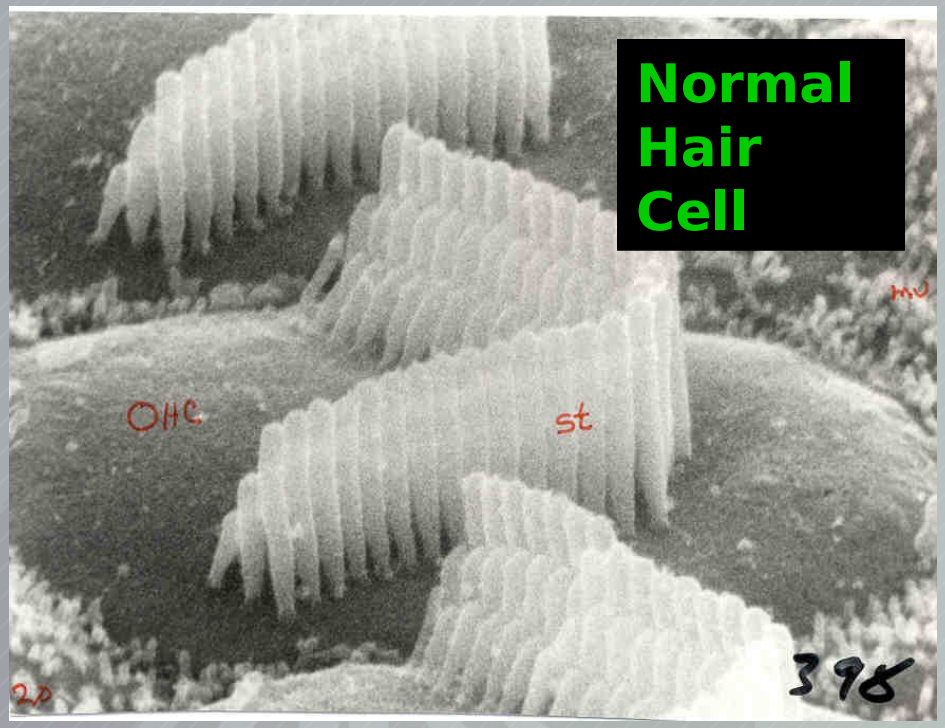
Sudden Impulse Noise from weapons fire can cause acute rupture of the eardrum and hearing loss in soldiers who do not use hearing protection (earplugs).

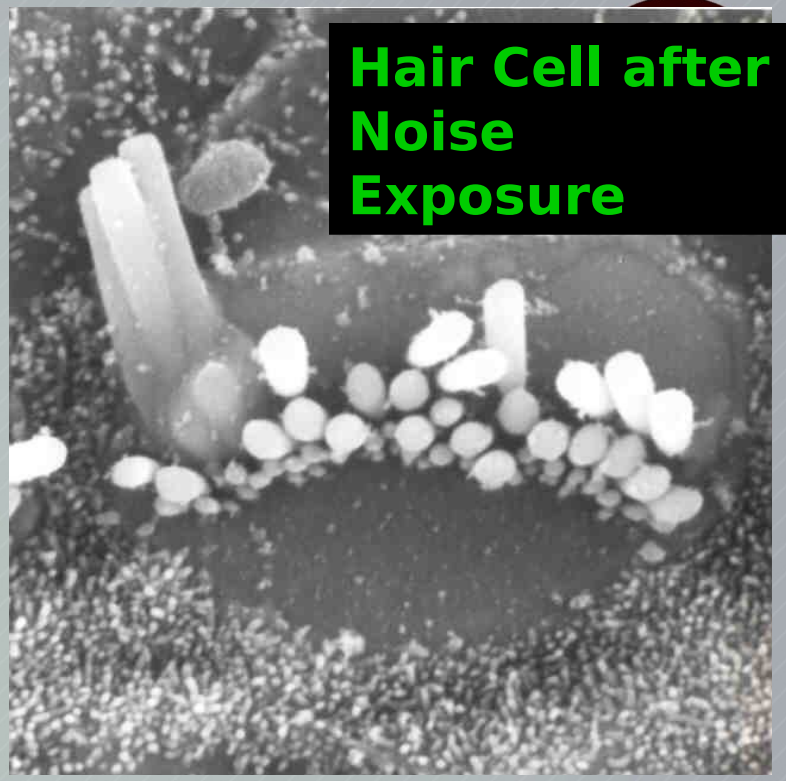
Normal, healthy, intact eardrum



Perforated eardrum







Exposure to hazardous noise (both impulse noise and steady state noise) without use of properly fitted hearing protection causes stresses to the inner ear, often leading to an oxidative process which results in **cell death**, **permanent hearing loss and tinnitus** (constant, bothersome ringing or buzzing sounds in the ear). Noise Induced Hearing Loss typically causes a loss of speech clarity and not a perceived loss of loudness. **This soldier says "I can hear you, but I don't understand what you're saying".**

The Damage is Invisible to Others and It Is…

PAINLESS
PROGRESSIVE
PERMANENT
PREVENTABLE !

There are often Temporary Warning Signs...

THRESHOLD SHIFT (TTS)

- Following weapons fire
- Following concert

TINNITUS*

- Ringing/Buzzing Sound

*This is your ear's way of saying it has been

Why Soldiers Need Good Hearing….

- Hearing is perhaps the Soldier's most sophisticated sensor
- We can HEAR the enemy long before we see the enemy!
  - 24/7 sense
  - Darkness
- Our ability to effectively communicate makes us lethal

Think About the Consequences…

- Listening posts
- Point on patrol
- Call for fire
  - (Note: most fratricide occurs as a result of miscommunication, not poor plotting or poor calculations)
- Urban warfare

H3

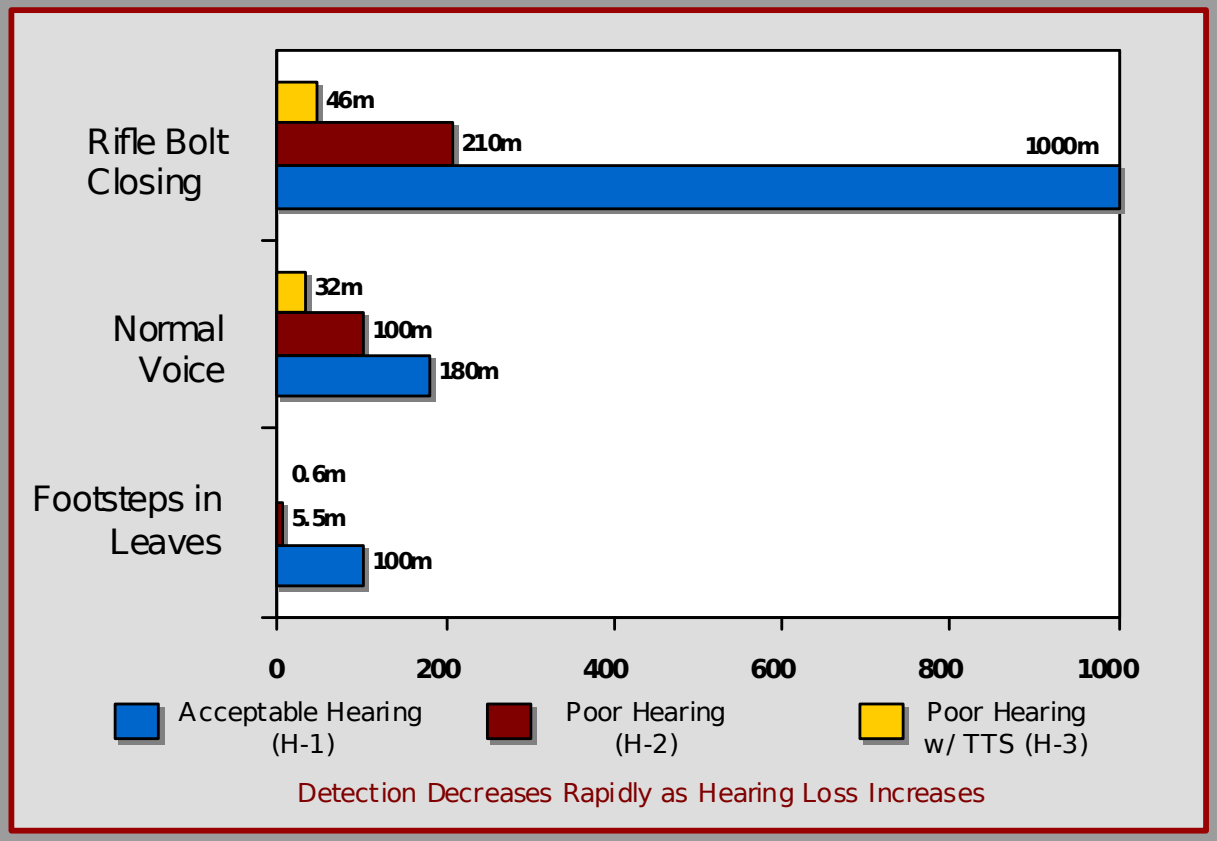
H1

Survivability and Lethality

- **If we cannot shoot, move and COMMUNICATE, then our effectiveness as an army is degraded!**
- **Communicating effectively with squad members during patrol or with higher headquarters by radio can make the difference between battles won and battles lost**

Hearing is a COMBAT MULTIPLIER.....

DETECTION OF SOUND BY HEARING ABILITY



WHAT IS HAZARDOUS NOISE?

At **85 dBA**, more than 8hrs exposure may result in permanent NIHL
At **140dBP** hazardous for impulse/impact noises

Steady State Noise:

Exposure to > 85 dBA steady state noise over an 8 hour period may result in a permanent hearing loss!
Here are some examples of Steady State Noise:

M966, M996, M997, M998, M1037, and other non-heavy high mobility multi-wheeled vehicle (HMMWV), at 2/3 payload →

78 dBA when idle

84 dBA when moving at 30 mph

94 dBA when moving at 55 mph

M1A2 Abrams Tank:

93 dBA when idle

108 dB when moving at 10 mph

Bradley M2A2 and similar

74 – 95 dBA when idle

110 dBA – 10 mph

115 dBA – 20 - 38 mph

How Much Steady State Noise is Too Much?

- >85 dBA **for 8 hrs (TWA) = hazardous**
- **Every additional** 3 **dB cuts maximum exposure** time without earplugs **in half:**
  - 85 dB = 8 Hr
  - 88 dB = 4 Hr
  - 91 dB = 2 Hr
  - 94 dB = 1 Hr
  - 97 dB = 30 min
  - 100 dB = 15 min

For Example: M2A2 Bradley Fighting Vehicle creates 110 dB of steady state noise inside the vehicle when moving at 10 mph. At that speed, how long can you stay inside without hearing protection (ear plugs or CVC) before you start to get a hearing loss?

Answer: Less than 2 minutes!

Examples of Impulse Noise

M4, blanks with suppressor
147dB

M4, live rounds
156dB

Shotgun 12 gauge
160dB

240B Machine Gun
165dB

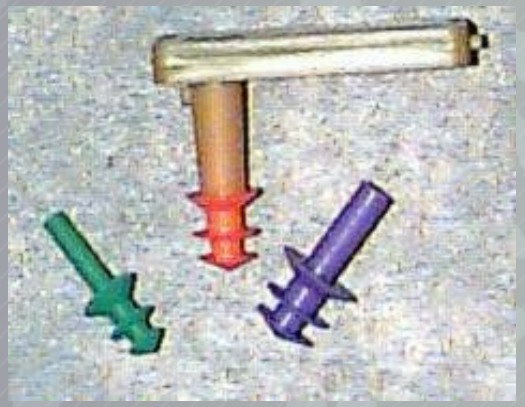
81 mm Mortar (Charge 4)
179dB

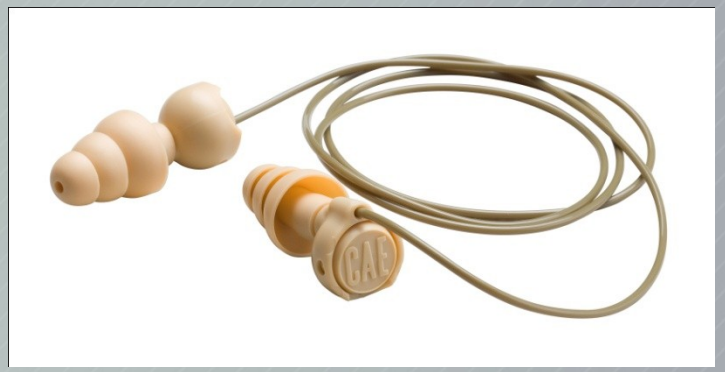
How Can You Prevent Hearing Loss?

1. Annual Hearing Monitoring
2. Select and use proper hearing protection
3. Receive and follow proper education
4. Practice safe hearing techniques both on and off the job

Authorized Earplugs:

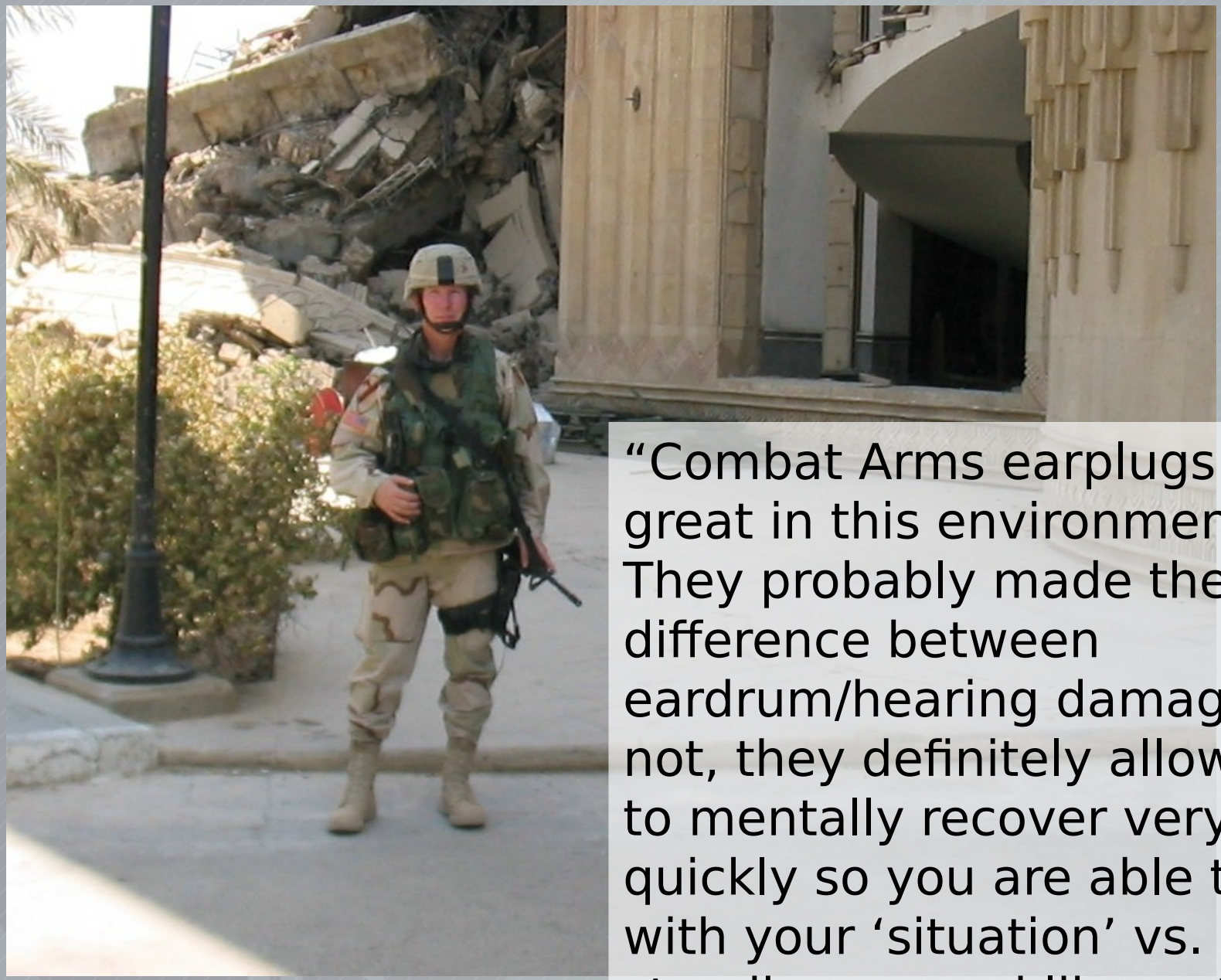
-There are no “one size fits all” earplugs.
-Pre-Formed Earplugs must be fitted by qualified Medical Personnel (walk-ins are welcome at SRC Hearing Readiness)





Initial contact with the enemy is usually auditory in nature. Many soldiers believe that earplugs are counter-indicated, and will decrease their ability to hear weak speech signals in a combat situation, and decrease their situational awareness.

This assumption is INCORRECT!



“Combat Arms earplugs work great in this environment. They probably made the difference between eardrum/hearing damage and not, they definitely allow you to mentally recover very quickly so you are able to deal with your ‘situation’ vs. standing around like a stunned

Approved Tactical Earplugs

SureFire Sonic Defender
EP-3 6515-01-549-
6457/6448/6453

Moldex BattlePlug
SKU – 6499/6498/6497

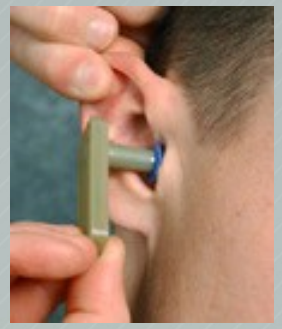
3M Combat Arms Earplug
6515-01-576-
8869/8861/8837

Proper Insertion of Triple Flange or Quad Flange Earplugs:

1) Use of the seating device is optional, but recommended.

Place earplug stem in seating device.

2) Reach over the head with the opposite hand and pull the ear outward to make the ear canal more accessible. Notice this maneuver is not always necessary with the earplug seating device.



3) Insert plug into ear canal.

Gently push and twist earplug toward the rear center of head.

4) The third flange should be **flush with the opening of the ear canal. Tension should be felt when lightly pulling on the stem of the earplug.**

When both earplugs are inserted, sounds are muffled and your voice is

5) Improperly fit triple-flange earplug!!

Hand-Formed Polyvinyl (foam) Earplugs (Unit Issue):

Sound Guard Earplugs

(size medium only)

NSN 6515-00-137-6345

$29.58 for 200 pair

There are various types of hand formed earplugs, but **the only DoD approved polyvinyl foam plug is shown above**. These earplugs come in one size (medium). As the name implies, these earplugs are formed by the hand and inserted into ear canal. They are bi-colored to help supervisors monitor the correct fit by noise-exposed personnel: If the second color can be seen when the earplug is in the ear, it is not fit correctly. Because they are formed by the hand they are not recommended for personnel who must remove and insert their earplugs many times during the day and whose hands come in contact with dirt or chemicals that could be transferred to the ear from the hand via the insertion of the earplug. Hand-formed earplugs can be re-used until they can no longer be cleaned and or until they lose their ability to be rolled down. These earplugs do not have to be initially fit by medically trained personnel.

Hand-Formed Polyvinyl (foam) Earplugs:

For soldiers who have very small or very large ear canals, installations are currently authorized to purchase the Aearo™ EAR® Classic SuperFit 30™ (designed for small canals) and the Aearo™ EAR® Classic SuperFit 33™ (designed for large ear canals)

SuperFit 30™ Aearo#310-1009 (for small ear canals) **www.GSAAdvantage.gov** $25.00 for 200 pair.

SuperFit 33™ Aearo#310-1008 (for large ear canals) **www.GSAAdvantage.gov** $27.00 for 200 pair.

The SuperFit 30™ and SuperFit 33™ is longer than the Classic EAR® foam earplug. DO NOT alter this earplug (ie. Cutting it in half) as the noise reduction benefit to the wearer will be degraded.

Proper Insertion of Hand-Formed (Polyvinyl) Earplugs:

1) Roll the earplug into a thin tightly compressed cylinder. Individuals with large ear canals should shape the earplug into a golf tee.

2) Place the earplug into the ear canal. Pulling back on the pinna with the opposite hand is not necessary but helps to straighten the ear canal making insertion easier.

Good Fit!

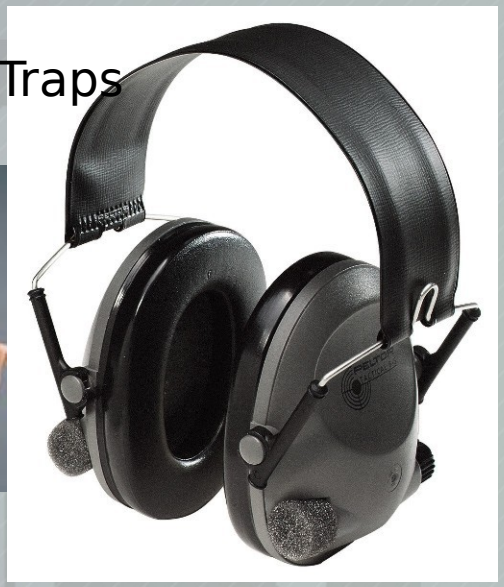
Improper Fit!

3) Gently hold finger over the earplug allowing it to expand in the ear canal.

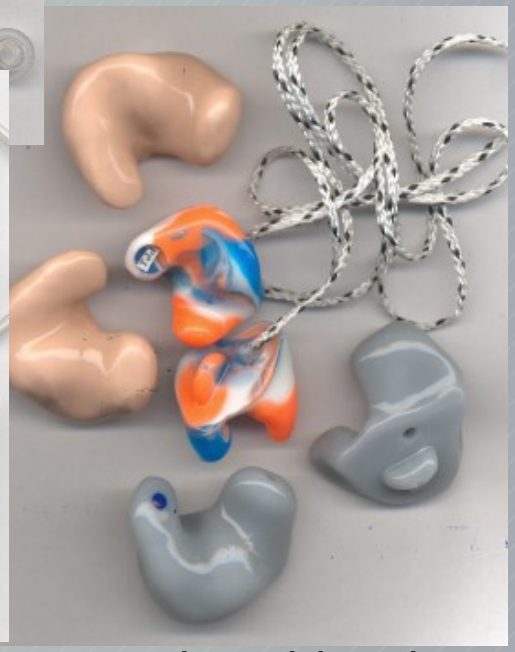
All earplugs work lose and must be reseated after a period of time. When this occurs with the hand formed earplug the earplug must be removed from the ear and reseated.

Other Types of Hearing Protective Devices: Circumaural Headphones, Custom earplugs

Peltor Sound Traps



Circumaural Headphones



Custom Earplugs are ordered by the Hearing Conservation Clinic at the SRP site at the discretion of the Audiologist.

Noise Induced Hearing Loss represent
negative personal, financial, and miss
individual soldiers and the A

The Bottom Line:

If you do not use hearing protection around hazardous noise, you will lose your hearing.

The great majority of hearing loss incurred by soldiers is incurred in a garrison or training environment. It *can and should* be prevented.

QUESTIONS???

For additional Information or questions, please call the

Fort Carson Hearing Program

526-6976